

University of Kentucky

Department of Chemistry

READ THESE DIRECTIONS CAREFULLY BEFORE STARTING THE EXAMINATION!

It is *extremely* important that you fill in the answer sheet EXACTLY as indicated, otherwise your answer sheet may not be processed; ALL entries are to be made on SIDE 1 of the answer sheet. Use a #2 pencil (or softer); fill in the circles completely and firmly. Erasures must be complete. Use only the following categories:

NAME:	Print your name starting at the first space, LAST NAME first, then a space, followed by your FIRST NAME, then another space, followed by your MIDDLE INITIAL. Fill in the <u>correct</u> circles below your printed name corresponding to the letters of your name; for the spaces, fill in the top blank circle.
STUDENT NUMBER:	This is VERY IMPORTANT! Under IDENTIFICATION NUMBER, put in your 8 DIGIT STUDENT ID NUMBER (do not use the 9 at the beginning of your number) beginning in column A and continuing through column H, column I will be blank, (do NOT use column J at this time); be sure to fill in the correct circles (a common error to be avoided is mistaking "0" for "1").
TEST FORM:	Fill in the "2" blank in the J column under IDENTIFICATION NUMBER (to indicate Hour Examination II).
SPECIAL CODES:	Use for course and section number; in positions K-P write in one of the following: <div style="text-align: center;"> Dr. Owen 105-001 Dr. Yates 105-002 (TR) or 401(MW, evening) </div>
SIGNATURE:	You MUST sign the examination answer sheet (bubble sheet) on the line directly above your printed name. Use your legal signature.

Answering Questions:

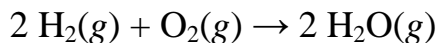
Starting with answer "1" on SIDE 1, fill in the circle indicating the one best answer for each of the 30 questions in this examination. Your score is the sum of the appropriate credit for each response. On the day following the examination, an examination key will be posted on Blackboard.

Grading and Reporting:

The examination scores will be posted in Blackboard as soon as possible after the examination. If an error has occurred in scoring your answers, inform your instructor within 48 hours of the posting of your score.

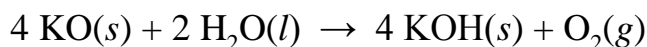
BE SURE THAT YOUR TEST HAS 30 QUESTIONS, A PERIODIC TABLE, AND ONE SHEET OF SCRATCH PAPER. You may NOT use your own scratch paper during this examination. Cell phones, computer, and pagers are to be turned off and out of sight during the exam.

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1. How much H₂O is produced when 18 moles of O₂ are allowed to react with an excess of H₂?



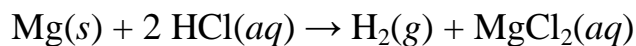
- A. 36 mol H₂O
B. 162 g H₂O
C. 27 mol H₂O
D. 18 mol H₂O

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2. For the following balanced reaction equation, how much KOH (molar mass = 56.1056 g/mol) will be formed from 7.54 moles of H₂O, if an excess of KO is present?



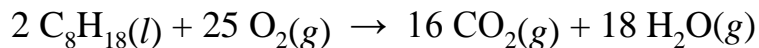
- A. 4.83 moles KOH
B. 16.7 moles KOH
C. 15.1 moles KOH
D. 7.56 moles KOH

-
3. Hydrogen gas is produced when magnesium metal is added to hydrochloric acid. If 5.0 grams of magnesium are added to a solution containing 1.01 moles of hydrochloric acid, which reactant limits hydrogen gas production?



- A. Mg(s)
B. MgCl₂(aq)
C. HCl(aq)
D. H₂(g)

-
4. What is the percent yield of CO₂ if 42.24 g of CO₂ are formed from the reaction of 4.00 moles of C₈H₁₈ with 8.00 moles of O₂ according to the balanced equation below?



- A. 18.75%
B. 23.25%
C. 27.50%
D. 45.00%
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5. How much sodium chloride is required to make 3.0 liters of a 0.50 M sodium chloride solution?

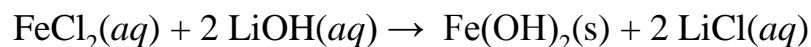
A. 1.5×10^2 g

C. 88 g

B. 44 g

D. 58 g

6. According to the following balanced reaction equation, how many moles of $\text{Fe}(\text{OH})_2$ will be produced from 225.0 mL of 0.227 M LiOH solution if FeCl_2 is present in excess?



A. 3.59×10^{-2} mol

C. 2.55×10^{-2} mol

B. 6.49×10^{-2} mol

D. 1.59×10^{-2} mol

7. Syrup is a concentrated solution of sucrose ($\text{C}_{12}\text{H}_{22}\text{O}_{11}$) used for many culinary applications. What volume of a 5.84 M syrup solution is needed to produce 5.40×10^{-1} L of a 1.00 M sucrose solution?

A. 92.5 mL

C. 13.9 mL

B. 46.3 mL

D. 3.15 mL

8. Which of the following compounds is soluble in water?

A. MgCO_3

C. PbCl_2

B. CaS

D. BaSO_4

9. What is the balanced chemical equation for the reaction that occurs when an aqueous solution of silver nitrate is mixed with a solution of potassium iodide?

- A. $\text{AgNO}_3(aq) + \text{KI}(aq) \rightarrow \text{AgI}(aq) + \text{KNO}_3(aq)$
- B. $\text{Ag}(\text{NO}_3)_2(aq) + 2\text{KI}(aq) \rightarrow \text{AgI}_2(aq) + 2\text{KNO}_3(aq)$
- C. $\text{Ag}(\text{NO}_3)_2(aq) + 2\text{KI}(aq) \rightarrow \text{AgI}_2(s) + 2\text{KNO}_3(aq)$
- D. $\text{AgNO}_3(aq) + \text{KI}(aq) \rightarrow \text{AgI}(s) + \text{KNO}_3(aq)$

10. Give the net ionic equation for the reaction that occurs when aqueous solutions of H_2SO_4 and KOH are mixed.

- A. $\text{H}^+(aq) + \text{OH}^-(aq) \rightarrow \text{H}_2\text{O}(l)$
- B. $2\text{K}^+(aq) + \text{SO}_4^{2-}(aq) \rightarrow \text{K}_2\text{SO}_4(s)$
- C. $\text{H}^+(aq) + \text{OH}^-(aq) + 2\text{K}^+(aq) + \text{SO}_4^{2-}(aq) \rightarrow \text{H}_2\text{O}(l) + \text{K}_2\text{SO}_4(s)$
- D. $\text{H}_2^{2+}(aq) + \text{OH}^-(aq) \rightarrow \text{H}_2(\text{OH})_2(l)$

11. How much 0.5 M KOH solution is required to neutralize 1.17 L of a 2.00 M H_2SO_4 solution?

- A. 2.34 L
- B. 18.7 L
- C. 9.36 L
- D. 14.0 L

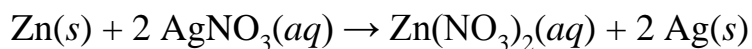
12. The titration of 25.0 mL of a H_2SO_4 solution of unknown concentration requires 83.6 mL of 0.120 M LiOH solution. What is the concentration of the H_2SO_4 solution?

- A. 0.100 M
 - B. 0.250 M
 - C. 0.201 M
 - D. 0.364 M
-

13. What is the oxidation number for each atom in KMnO_4 ?

- A. $\text{K} = +1, \text{Mn} = +3, \text{O} = -1$ C. $\text{K} = +2, \text{Mn} = +6, \text{O} = -8$
B. $\text{K} = +1, \text{Mn} = +7, \text{O} = -2$ D. $\text{K} = +1, \text{Mn} = +7, \text{O} = -8$
-

14. What is the reducing agent in the following reaction?



- A. N C. Ag
B. Zn D. None. This is not a redox reaction.
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15. Which represents a pressure of 800 mmHg?

- A. 1.05 atm C. 3.15 atm
B. 6.08 atm D. 2.10 atm
-

16. To what volume will a 2.33 L sample of gas expand if it is heated from 50.0°C to 800.0°C ?

- A. 5.57 L C. 9.74 L
B. 7.74 L D. 17.9 L
-

17. An ideal gas occupies a volume of 5.7 liters. The volume expands to 11 liters when 4 moles of the gas are added at constant pressure and temperature. How much gas was initially present?

- A. 2 moles C. 4.3 moles
B. 8.3 moles D. 5 moles
-

18. Which of the following is contained in the ideal gas law?

- A. Cole's Law C. Avogadro's Law
B. Dalton's Law D. Graham's Law
-

19. What is the pressure of 2.00 moles of an ideal gas occupying 1000.0 mL at 25 °C?

- A. 48.8 atm
B. 24.9 atm
C. 0.0244 atm
D. 36.6 atm

20. Which of the following samples will have the greatest volume at STP?

- A. 1.91×10^{24} atoms of Ne
B. 7.0 moles of Cl₂
C. 22 g of He
D. All of these samples would have the same volume at STP.

21. What is the density of fluorine gas at 37 °C and 757 mm Hg?

- A. 2.54 g/L
B. 1.54 g/L
C. 3.08 g/L
D. 0.770 g/L

22. A 0.665 g sample of a gaseous compound occupies 245 mL at 298 K and 1.22 atm. What is the molar mass of the compound?

- A. 54.4 g/mol
B. 89.1 g/mol
C. 33.9 g/mol
D. 177.4 g/mol

23. A gaseous mixture of argon, xenon, and helium has a total pressure of 1.5 atm with argon and helium having a combined pressure of 0.75 atm. What mass of xenon is present in 3.0 liters of the mixture at 298 K?

- A. 10.0 g Xe
B. 2.3 g Xe
C. 13 g Xe
D. 12.1 g Xe
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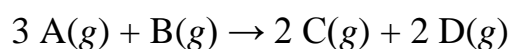
28. For the change in the internal energy, ΔE_{sys} , of a thermodynamic system to always be negative, what must be true?

- A. q must equal w .
- B. The losses in thermal energy cannot occur.
- C. Energy must be allowed to flow into of the system.
- D. The work done by the system must exceed the gain in thermal energy.

29. Which of the following exhibits a similar relationship with the increasing global temperatures observed over the past 150 years?

- A. decreasing global industrialization
- B. increasing reliance on renewable energy sources
- C. decreasing carbon dioxide production
- D. increasing atmospheric carbon dioxide levels

30. The following gaseous reaction occurs in a closed container at a constant temperature. Which of the following statements must always be true?



- A. The pressure in the container does not change during the reaction.
 - B. This is an acid-base reaction.
 - C. $\text{CH}_4(g)$ is the limiting reactant.
 - D. No reaction can occur under these conditions.
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CHE 105 SP 2013 Exam 2 key

1. A
2. C
3. A
4. A
5. C
6. C
7. A
8. B
9. D
10. A
11. C
12. C
13. B
14. B
15. A
16. B
17. C
18. C
19. A
20. B
21. B
22. A
23. D
24. D
25. B
26. D
27. A
28. D
29. D
30. A